# COMPUTER SCIENCE

**HEAD OF DEPARTMENT**
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**Exam Board**
AQA

**Specification**
7517

## COURSE DETAILS

**Examination**
The course is examined at the end of Year 13 by 2 exams (1 written 1 on screen). In addition, there is a non-examined assessment (NEA) worth 20% of the final grade completed during the course.

**Unit 1:**
This unit focuses on programming using standard programming concepts such as definite and indefinite iteration with conditions, use of arithmetic, relational and Boolean operations. Students will also program using an object-oriented method. Students will also develop their knowledge of the theoretical side of computer science ranging from fundamentals of programming to the theory of computation (abstraction, decomposition, composition and automation). This unit will also include the fundamentals of algorithms and the skills learnt whilst studying the systematic approach to problem solving.

**Unit 2:**
This unit focuses on fundamentals of data representation such as natural, rational, irrational, real and ordinal numbers plus different number systems used by computers to represent data. Networking and the Internet. Fundamentals of computer systems includes hardware, software and programming languages as well as computer organization and architecture and consequences of functional programming. This unit also includes fundamentals of databases, big data and the fundamentals of functional programming.

**Unit 3: Non-Exam Assessment – The computing practical project**
The non-exam assessment assesses a student's ability to use the knowledge and skills gained through the course to solve or investigate a practical problem. Students will be expected to follow a systematic approach to problem solving. When creating the project, a student will analyse, design, create and test a program to solve a problem, this could be a website with dynamic content and a database back-end, a mobile app, an application for artificial intelligence, a computer game or something completely different.

In preparation for starting 'A' level computing in Year 12, it is important that you have a good understanding of the concepts taught at GCSE.

We also need you to be at a reasonable standard of Python programming, as this is the language that we will use for most of the A level. We feel that it is more beneficial for you to develop a better understanding of 1 language, rather than having a shallow understanding of 2 or 3.

Please review the material and complete the Game boards by creating an account on the ISAAC computer science website…

https://isaaccomputerscience.org/topics/gcse_programming_concepts

https://isaaccomputerscience.org/topics/gcse_data_representation

https://isaaccomputerscience.org/topics/boolean_logic

https://isaaccomputerscience.org/topics/gcse_systems

https://isaaccomputerscience.org/topics/gcse_networking


After that, have a go at the following programming task,


**The Puzzle Club**

The Puzzle Club was founded several years ago by a group of primary school teachers. The aim of theclub is to create puzzles that will encourage children to develop their language and spelling skills.

The club decided to develop some on-screen puzzles to engage more reluctant learners to attempt puzzles that will give them opportunities to develop their skills.

The first type of puzzle they have decided to move on to screen is a cryptogram. A cryptogram requires the puzzler to solve a simple letter substitution cipher.

Each time a cryptogram is created a different set of random numbers are allocated to the letters of the alphabet. The person setting the puzzle then uses the cipher to write a sentence using the numbers rather than the letters. To help the puzzler the setter chooses two letters that will be givenaway as clues, as in the diagram below

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | 1 | 7 |   |   |   |   |   |   |

```
 T   _  _        _        S    _   _        T   _  _      _   _   _   _   _  T  S     _   _   _
 7  13 11     2  10  5    1    15 20  2    7  13 11     3  15 16 16  9  7  1     15  3 11

                      S   _   _   _   _   _   _
              15     20 19  9   1  15 20 26 11
```


You have been asked to create an application for the puzzle club that will allow the user to:

• Enter a title for the puzzle

• Enter the phrase to be encoded

• Enter the give-away letters

• Allocate random numbers to each of the letters of the alphabet

• Generate an alphabet grid with the random numbers for the give-away letters displayed (as above)

• Generate the puzzle with give-away letters showing letters displayed (as above)

• Allow the puzzler to guess one letter at a time by entering the number and letter

• Add the number to the grid if correct and display the letter in the sentence

• Store the puzzler's results in a text file that records the Puzzlers name, date, title of the puzzle and the number of guesses it took them to solve the puzzle

**Code this in Python, Paste your code/link to a REPLIT.com REPL below and email this sheet to jsumsion@gordons.school before the start of Y12**

Help for coding can be found at: http://computing.outwood.com/NEA/python/index.html or https://www.w3schools.com/python/default.asp